

## Introduction

“Nova-67P” is a parallel parametric equalizer plugin combined with a compressor. The compressor can operate in full-band or split-band mode. In latter case the plugin becomes a dynamic equalizer.

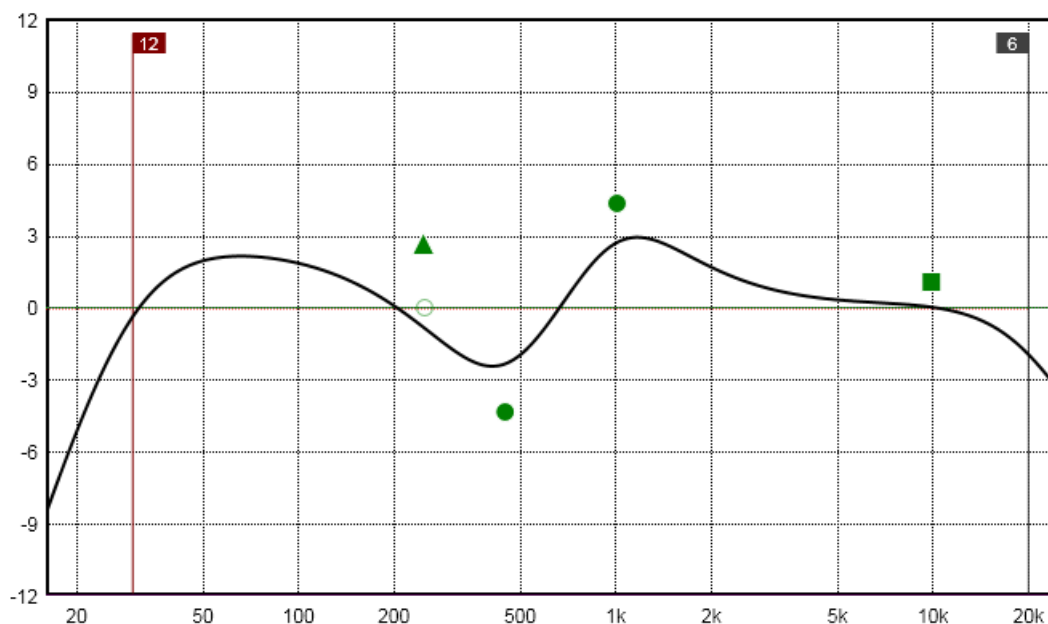
Typical usage scenarios:

1. Various tone and dynamic shaping tasks.
2. Frequency dependent full-band compression.
3. Up to 6 bands multi-band compression.
4. Dynamic resonance and harshness suppression.
5. Resolving frequency overlaps between tracks using sidechaining.

## Part 1. Basic tasks. EQing & Compressing

### 1.1. Parallel EQ

“Nova-67P” plugin is a parallel parametric EQ. How does parallel EQ work? It extracts parts (bands) of original audio signal using low-pass, band-pass or high-pass filters and adds (or subtracts) them to the original signal to form usual low-shelf, peaking or high-shelf curves in a very natural way. If controlled bands overlap each other, a parallel equalizer operates in a slightly different way from regular equalizers.

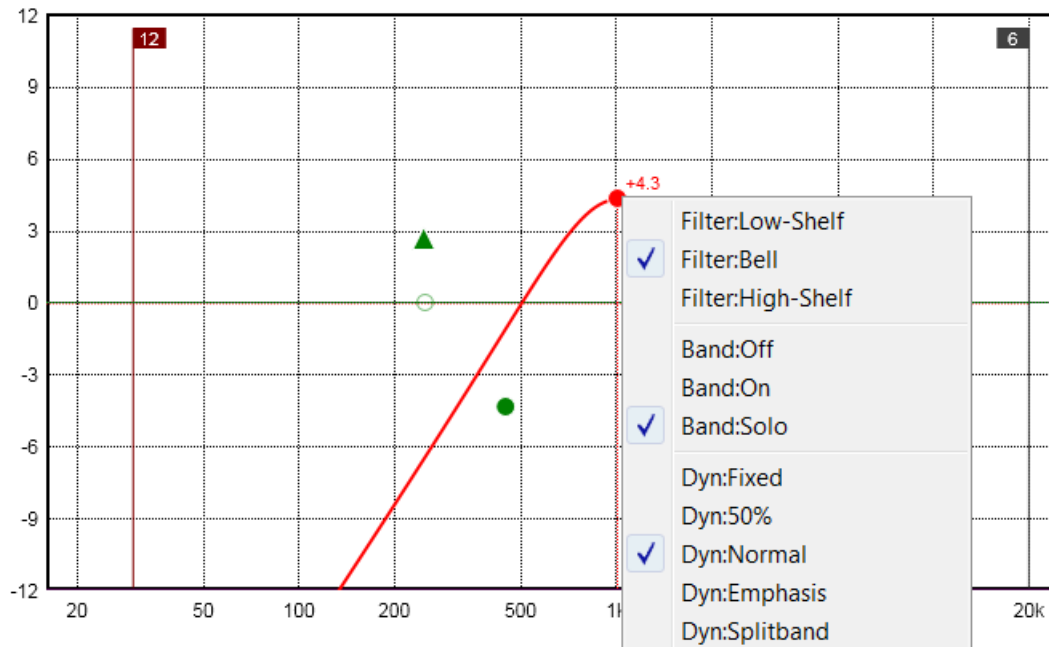


**Pic. 1. EQ display**

Each “green” point on the picture represents a control point for one of the filters. The resulting curve painted as bold black line. “Empty” green points are deactivated and thus don’t affect the curve. A point shape of triangle represents low-shelf filter, a square represents high-shelf one and a circle represents bell-curve.

- Use drag & drop to change frequency and gain for each point.
- Use mouse wheel or Alt + drag to change Q value and thus to affect the resonance of the band.
- Use double click to activate/deactivate the band.

- Use Alt + double click to solo the band. Several bands can be soloed.
- Use Ctrl + click to reset band's gain to zero dB.
- Use Ctrl + middle button click to reset band's Q value to default.
- Use Shift + drag to increase precision.
- Use right button click to open band's context menu.



**Pic. 2. Solo mode and a band's context menu**

Gain of a control point can be adjusted from  $-12$  dB to  $+12$  dB. Frequencies can be swept from 20 Hz to 20 kHz.

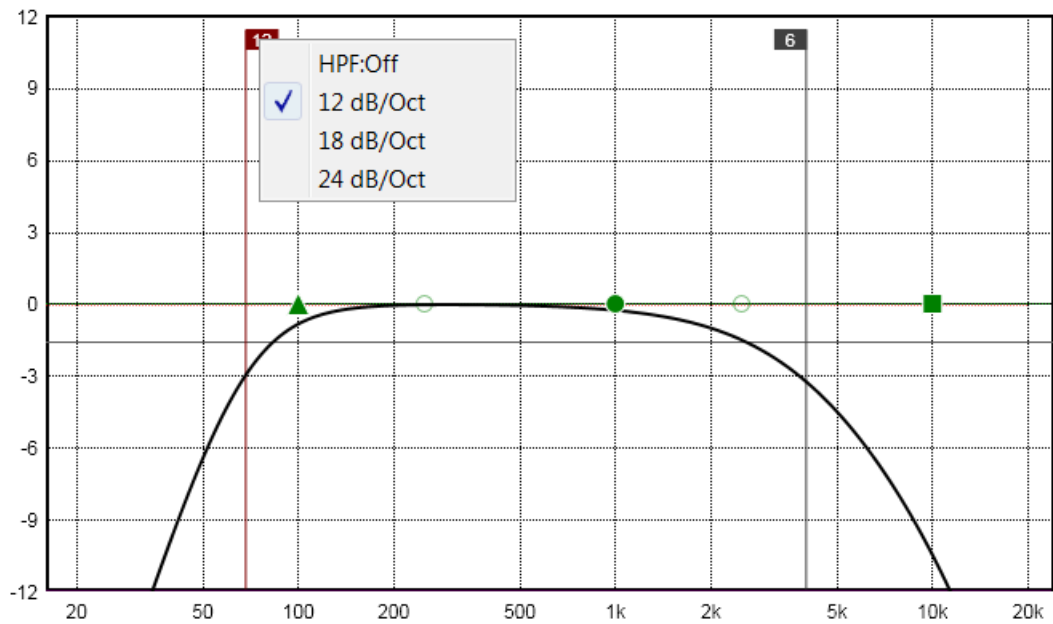
There're also high-pass and low-pass filters controls at the left and the right of EQ display.

To activate high-pass filter, double click on grey "HP" square.

- Use horizontal drag to change high-pass frequency.
- Use double click to cycle through high-pass filter slope values (12, 18 and 24 dB/Oct) and back to "Off" state.
- Use Alt + double click to cycle through high-pass filter slope values in reverse order.
- Use right button click to open high-pass filter context menu.

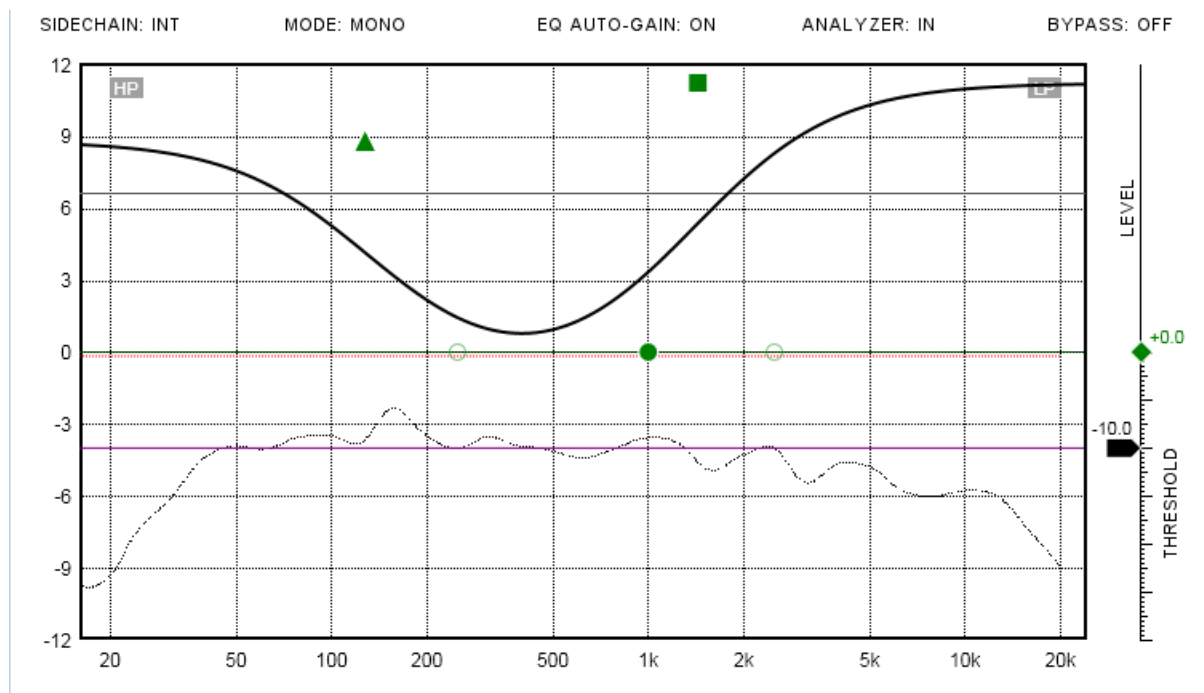
To activate low-pass filter, double click on grey "LP" square.

- Use horizontal drag to change low-pass frequency.
- Low-pass filter has fixed 6 dB/Oct slope.
- Use right button click to open low-pass filter context menu.



**Pic. 3. High-pass and low-pass filters**

Topmost line of the plugin window contains mode controls.



**Pic. 4. Mode controls are located at the topmost line of the plugin window**

The most important modes for EQ operations are:

1. “MODE: MONO/STEREO”. By default the plugin operates in mono mode. This mode helps to save CPU cycles when the plugin used on mono tracks or on stereo tracks containing mono audio signal. Don’t forget to change it to stereo.
2. “EQ AUTO-GAIN: ON/OFF”. This parameter controls auto-gain loudness compensation, which works in a static manner (i.e. doesn’t depend on input audio signal). Loudness compensation mode performs EQ curve analysis only and it doesn’t compensate level change caused by compressor. The compensated “zero dB” value is

shown by grey horizontal line. For example on Pic.4 huge amount of boost is used but due to EQ loudness compensation “zero dB” line shifted to 7 dB, which means -7 dB of gain compensation.

3. “BYPASS: ON/OFF”. This parameter controls the whole audio processing bypass. Only stereo to mono conversion (in mono mode) remains active.

## 1.2. Spectrum analysis

The plugin has third-octave RMS spectrum analyzer. This analyzer was designed to be as real-time as possible and it has great precision down to 15 Hz. “Corner” points for the third-octave analyzer were selected in a musical (with B as a basis) but not in a “scientific” way (with 1 kHz as a basis).

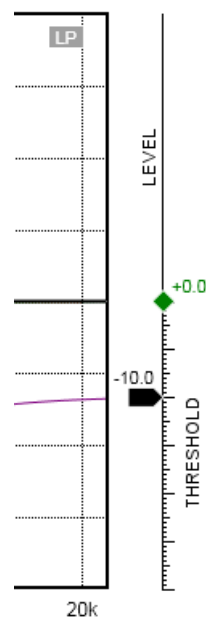
Calibration: -18 dBFS sine signal of 987.766 Hz gives 0 dB on the analyzer display. VU-meter ballistic (integration time of 300 ms to achieve 99%) was used.

Analyzer’s visible range is limited by -60 dB. Analyzer operates with reduced bit-precision, which may lead to some visible noise on low-frequency low-level signals. It doesn’t affect audio quality.

Use “ANALYZER: OFF” parameter to turn the analyzer off to save CPU cycles. Analyzer curve is not calculated when the plugin window is not shown. Input, output or sidechain signal can be analyzed. In stereo mode the average of both curves is shown.

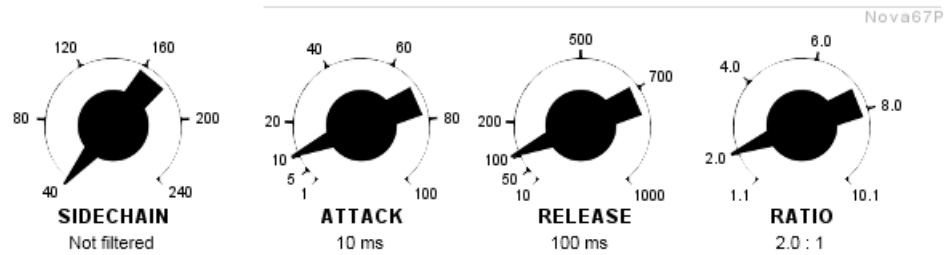
## 1.3. Full-band compression

The full-band compressor performs the analysis of an input signal before equalization. The compressor is RMS based. Threshold, makeup parameters and meters of the compressor are to the right of the EQ display.



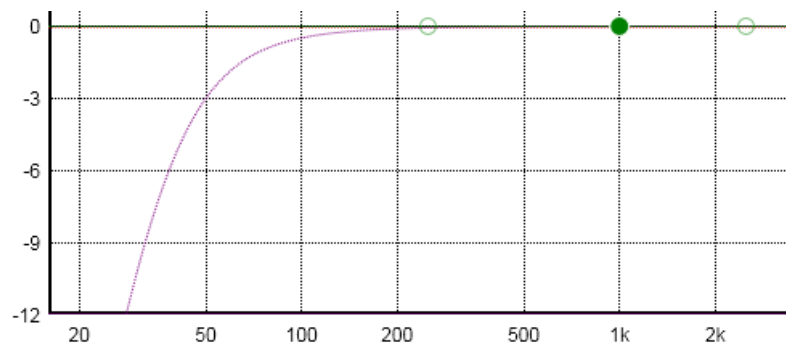
**Pic. 5. Threshold and makeup level sliders of the full-band compressor**

You can adjust the threshold using the black slider. The threshold range is from 0 dB to -30 dB. Each long dash on the ruler is 5dB for this case. You can adjust the compressor's makeup level using the green diamond-shaped makeup control. The makeup range is from -12 dB to +12 dB. Each long dash on the ruler is 2 dB for this case.

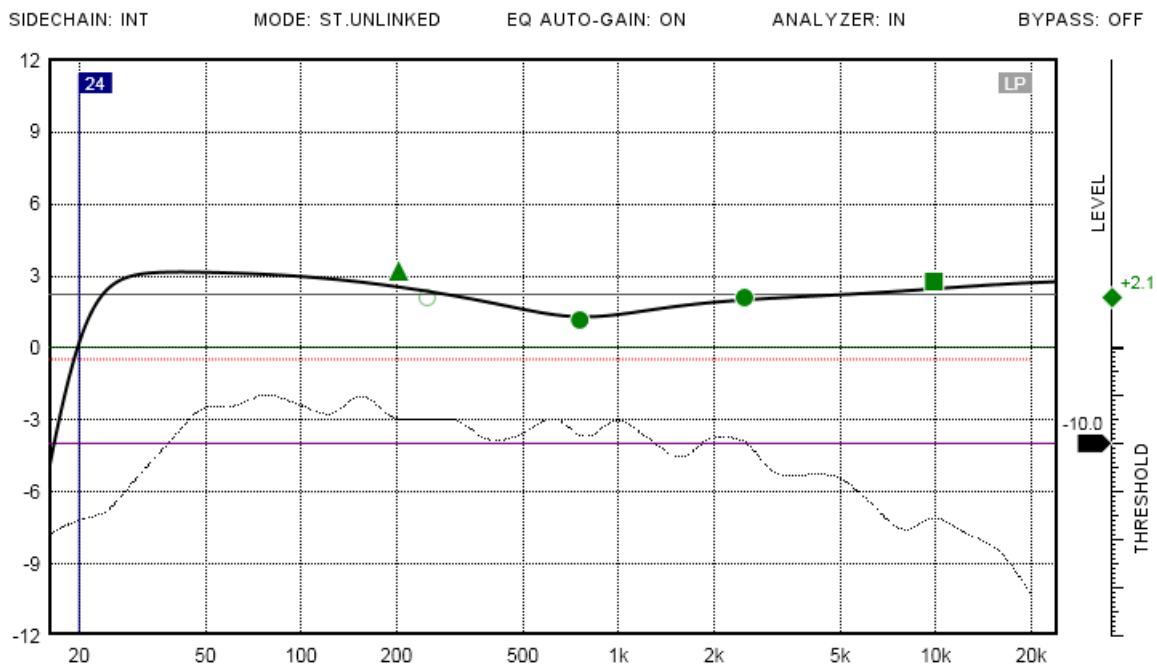


**Pic. 6. Compressor's attack, release and ratio parameters and sidechain high-pass filter control**

You can adjust the compressor's attack, release and ratio parameters by corresponding knobs. The sidechain input used for compressor can be high-passed to reduce "pumping" effect using "SIDECHAIN" control. Sidechain high-pass curve is shown by purple color on the EQ display.



**Pic. 7. Sidechain high-pass curve set up for 50 Hz**



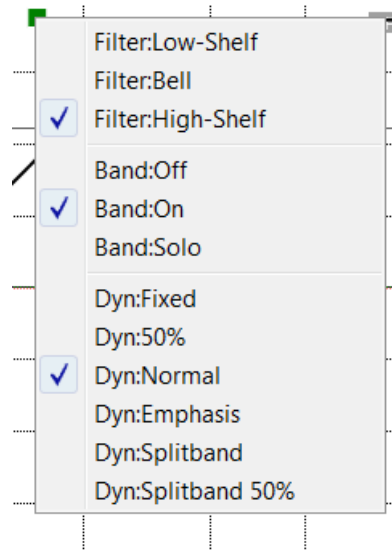
**Pic. 8. Threshold curve (purple) at -10 dB and gain reduction curve (red)**

Compression threshold (purple) and gain reduction (dotted red) curves are shown on the EQ display (Pic. 8). The threshold curve has the same scale as “Threshold” slider (-30 dB total) the gain reduction curve has the same scale as EQ points (-12 dB total).

You may read gain reduction value from red curve and adjust “MASTER” gain control to maintain the same loudness after compression.

#### 1.4. Frequency-dependent compression

How does this full-band compressor affect the signal? Each EQ band can be set to the specified dynamic mode (Pic. 9).



**Pic. 9. Dynamic modes for a band listed as “Dyn” at the bottom of the list**

**Normal** (green EQ point). The full-band compressor’s gain reduction affects this band.

**Fixed** (black EQ point). The full-band compressor’s gain reduction doesn’t affect this band, thus this band is not “compressed”.

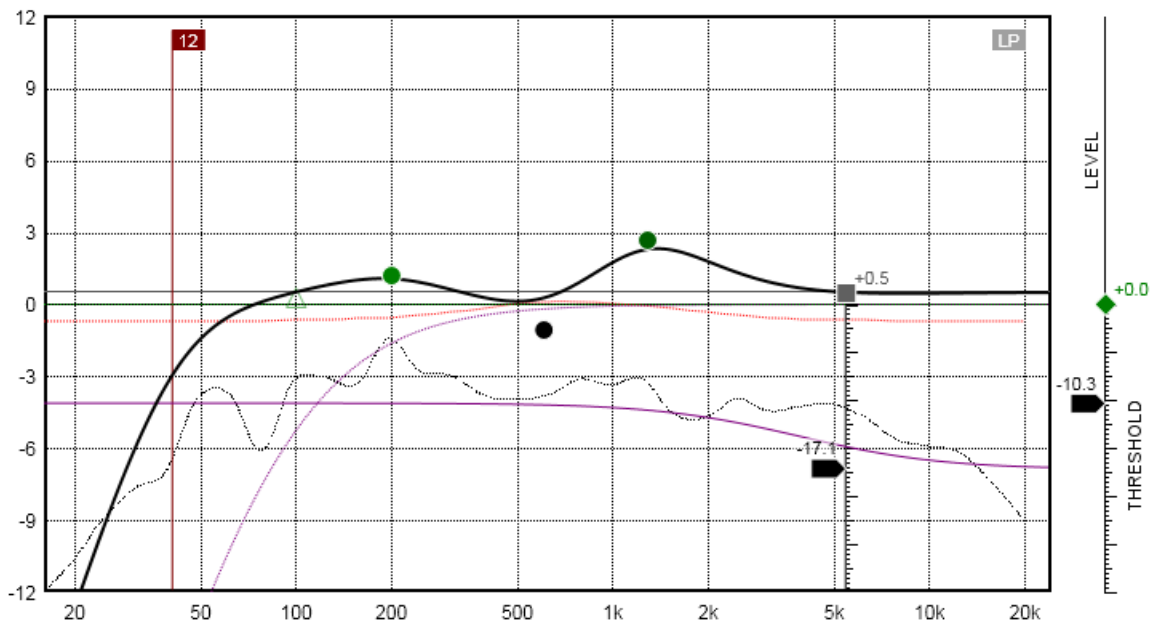
**50%** (dark green EQ point). The full-band compressor’s gain reduction affects this band only in 50%, thus this band is 50% mix between “fixed” and “normal”.

**Emphasis** (grey EQ point). The same as “normal” but threshold value of this band used to pre-equalize sidechain signal before it hits the full-band compressor. This mode can make the compressor to be more “sensible” to some frequencies and less “sensible” to another.

**Splitband** (blue EQ point). Separate split-band compressor with separate threshold value used for this band (see below).

**Splitband 50%** (dark cyan EQ point). The same as “splitband” but gain reduction for this band is calculated as 50% mix between separate split-band compressor and the full-band compressor.

Check Pic.10. The black point at 600 Hz has “fixed” mode and thus gain reduction curve (red) doesn’t affect this area. The gray point at 5.3 kHz has “emphasis” mode and the threshold value for this point makes the compressor to be more sensible at high frequency range (see purple threshold curve). Keep in mind that sidechain high-pass curve (dotted purple one) reduces the compressor’s sensibility for low frequencies too.



**Pic. 10. Frequency dependent compression example**

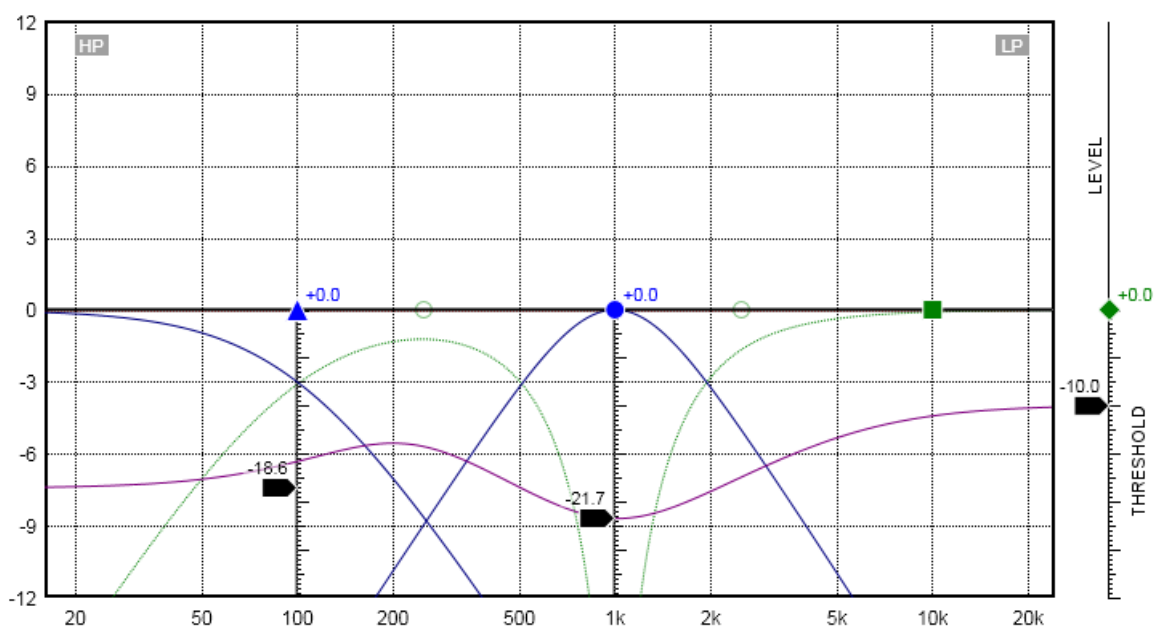
Besides frequency dependent compression there is also frequency depended makeup. Use level makeup control (green diamond at the right of the EQ display) to restore gain reduction. This value affects only green EQ points (“Normal” mode) and dark green ones (“50%” mode).

And finally if you don’t want to use full-band compression, set “Threshold” value to 0.0 dB and “Ratio” control to 1.1. In this case the minimum amount of gain reduction will be applied and you can treat it as some kind of signal coloration to add some “breathe” to the signal.

## Part 2. Advanced tasks. Split-band compression and sidechaining

### 2.1 Split-band compression

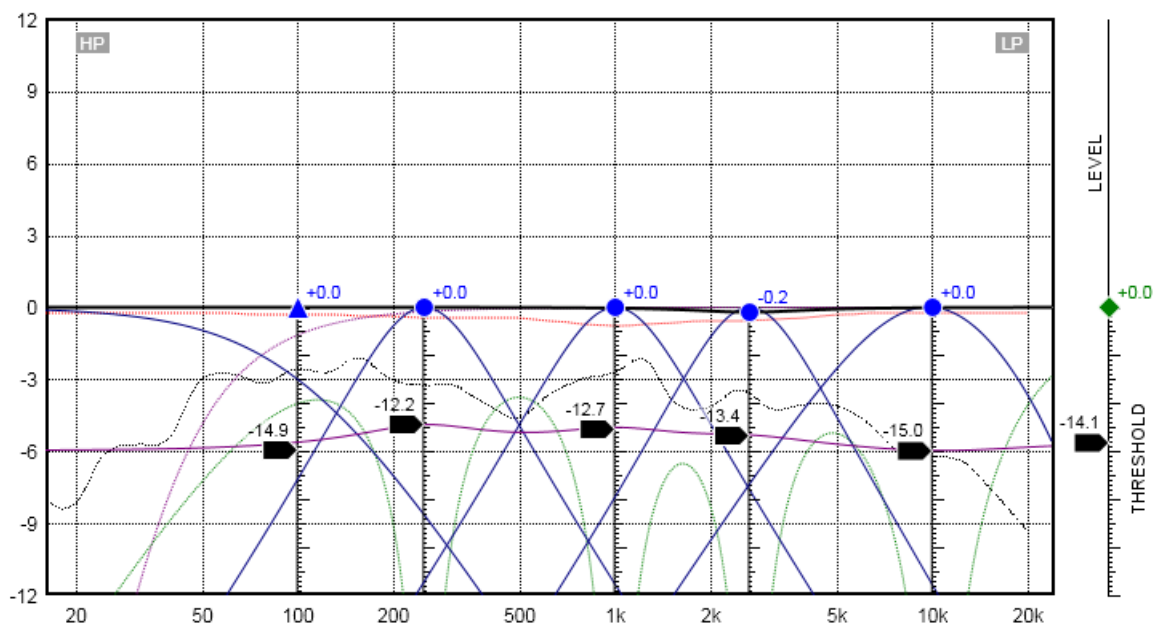
If you set any EQ point to “Splitband” mode, new curves are shown.



**Pic. 11. “Splitband” dynamic mode for 100 Hz and 1 kHz points**

Dark blue curve is band-pass curve of a band. It shows exactly what happens under the hood of a parallel equalizer. This band-pass filter used for equalization but also in parallel it drives a separate compressor. You can adjust the threshold for this compressor and this change affects total threshold curve (purple). You also can adjust band's frequency, Q value and band's gain thus changing both EQ curve and compression band at the same time. A split-band compressor has the same attack, release and ratio parameters as the full-band one.

Light green curve is the input signal minus all bandpassed curves. This remaining "green" signal still drives the full-band compressor and you can control full-band compressor's threshold to compress it. You may also leave some empty space between bands to use "green" compression as one more band but also you may use it just to "glue" crossover points between multiple dynamic bands (pic. 12).



**Pic. 12. An extreme use of split-band compression**

## 2.2. Sidechaining

Also you can use external sidechain to resolve frequency overlaps for example between kick and bass tracks! Just feed the kick track to sidechain inputs, add dynamic low-frequency band, adjust threshold and timing and voila!

If your host supports flexible input routing, assign the main signal to inputs 1/2 and the key signal to inputs 3/4, then set "SIDECHAIN" parameter to "Ext.". If your host doesn't support such feature you still can use sidechaining but in mono mode only. Send the main signal to the left channel and the key signal to the right channel of the plugin then set "SIDECHAIN" parameter to "R-chan".

## Part 3. Installation

On Windows copy Nova67P.dll into VST<sup>1</sup> plugins folder.

On Mac copy Nova67P.vst into /Library/Audio/Plug-Ins/VST and Nova67P.component into /Library/Audio/Plug-Ins/Components

<sup>1</sup> VST is a trademark of Steinberg Media Technologies GmbH